**ESS Topic 2: Ecosystems**

2.1 Structure

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| Distinguish between biotic and abiotic (physical) components of an ecosystem |  |  |  |
| Define the term trophic level |  |  |  |
| Identify and explain trophic levels in food chains and food webs selected from the local environment |  |  |  |
| Explain the principles of pyramids of numbers, pyramids of biomass, and pyramids of productivity, and construct such pyramids from given data |  |  |  |
| Discuss how the pyramid structure affects the functioning of an ecosystem |  |  |  |
| Define the terms: species, population, niche, community, and ecosystem with reference to local examples |  |  |  |
| Describe and explain population interactions using examples of named species |  |  |  |

2.2 Measuring Abiotic Components of the System

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| List the significant abiotic (physical) factors of an ecosystem |  |  |  |
| Describe and evaluate methods for measuring at least three abiotic (physical) factors within an ecosystem |  |  |  |

2.3 Measuring Biotic Components of the System

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| Construct simple keys and use published keys for the identification of an organism |  |  |  |
| Describe and evaluate methods for estimating abundance of organisms |  |  |  |
| Describe and evaluate methods for estimating biomass or trophic levels in a community |  |  |  |
| Define the term diversity |  |  |  |
| Apply Simpson’s diversity index and outline its significance |  |  |  |

2.4 Biomes

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| Define the term biome |  |  |  |
| Explain the distribution, structure and relative productivity of tropical rainforests, deserts, tundra, and any other biome |  |  |  |

2.5 Function

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| Explain the role of producers, consumers and decomposers in the ecosystem |  |  |  |
| Describe photosynthesis and respiration in terms of inputs, outputs and energy transformations |  |  |  |
| Describe and explain the transfer and transformation of energy as it flows through an ecosystem |  |  |  |
| Describe and explain the transfer and transformation of materials as they cycle within an ecosystem |  |  |  |
| Define the terms: gross productivity, net productivity, primary productivity, and secondary productivity |  |  |  |
| Define the terms and calculation the values of both gross primary productivity (GPP) and net primary productivity (NPP) from given data |  |  |  |
| Define the terms and calculate the values of both gross secondary productivity (GSP) and net secondary productivity (NSP) |  |  |  |

2.6 Changes

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| Explain the concepts of limiting factors and carrying capacity in the context of population growth |  |  |  |
| Describe and explain S and J population curves |  |  |  |
| Describe the role of density-dependent and density-independent factors, and internal and external factors, in the regulation of populations |  |  |  |
| Describe the principles associated with survivorship curves including, K- and r- strategists |  |  |  |
| Describe the concept and processes of succession in a named habitat |  |  |  |
| Explain the changes in energy flow, gross and net productivity, diversity and mineral cycling in different stages of succession |  |  |  |
| Describe factors affecting the nature of climax communities |  |  |  |

2.7 Measuring Changes in the System

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| **Learning Outcomes** | **Main Ideas** | **Specific content that you would use to answer this question** | **Relevant Case Studies & Description** |
| Describe and evaluate methods for measuring changes in abiotic and biotic components of an ecosystem along an environmental gradient |  |  |  |

You will not be assessed on 2.7.2 or 2.7.3, we will do these next year.